MH #3 2838

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Kornbluh, et al.

Application No.: 10/053,511

Filed: January 16, 2002

Title: Variable Stiffness Electroactive Polymer Systems

Attorney Docket No.: SRI1P035/US-4237-2

Examiner: Unassigned

Group: 2838

INFORMATION DISCLOSURE STATEMENT
37 CFR §§1.56 AND 1.97(b)

Commissioner for Patents
Washington, DC 20231

Dear Sir:

The references listed in the attached PTO Form 1449, copies of which are attached, may be material to examination of the above-identified patent application. Applicants submit these references in compliance with their duty of disclosure pursuant to 37 CFR §§1.56 and 1.97. The Examiner is requested to make these references of official record in this application.

This Information Disclosure Statement is not to be construed as a representation that a search has been made, that additional information material to the examination of this application does not exist, or that these references indeed constitute prior art.

This Information Disclosure Statement is believed to be filed before the mailing date of a first Office Action on the merits. Accordingly, it is believed that no fees are due in connection with the filing of this Information Disclosure Statement. However, if it is determined that any fees are due, the Commissioner is hereby authorized to charge such fees to Deposit Account 500388 (Order No. SRI1P035).

Respectfully submitted,
BEYER WEAVER & THOMAS, LLP

William J. Plut
Limited Recognition Under 37 C.F.R. 10.9(b)

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Expires: June 10, 2002

William J. Griffin, Acting Director
Office of Enrollment and Discipline

Form 1449 (Modified)	Atty Docket No.	Application No.:
Information Disclosure Statement By Applicant	**SRI1P035**	**10/053,511**
	Applicant: **Kornbluh, et al.**	
(Use Several Sheets if Necessary)	Filing Date **January 16, 2002**	Group **2838**

U.S. Patent Documents

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
	A1	5,977,685	11/02/99	Kurita, et al.			06/03/96
	A2	6,060,811	05/09/00	Fox, et al.			07/25/97
	A3	6,249,076	06/19/01	Madden, et al.			04/14/99
	A4	4,885,783	12/05/89	Whitehead, et al.			04/10/87

Other Documents

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
	B1	Ashley, S., "Smart Skis and Other Adaptive Structures", *Mechanical Engineering*, November 1995, pp. 77-81
	B2	Bar-Cohen, Yoseph, JPL, *Worldwide Electroactive Polymers, EAP (Artificial Muscles) Newsletter,* Vol. 3, No.1, June 2001
	B3	Bharti, V., H. S. Xu, G. Shanthi, and Q. M. Zhang, "Polarization and Structural Properties of High Energy Electron Irradiated Poly(vinylidene fluoride-trifluoroethylene) Copolymer Films," to be published in J. Appl. Phys. (2000).
	B4	Bobbio, S., M Kellam, B. Dudley, S. Goodwin Johansson, S. Jones, J. Jacobson, F. Tranjan, and T. DuBois, "Integrated Force Arrays," in Proc. IEEE Micro ElectroMechanical Systems Workshop, Fort Lauderdale, Florida February 1993.
	B5	Calvert, P. and Z. Liu, "Electrically stimulated bilayer hydrogels as muscles," Proceedings of the SPIE International Symposium on Smart Structures and Materials: Electro-Active Polymer Actuators and Devices, March 1-2, 1999, Newport Beach, California, USA, pp. 236-241.
Examiner		Date Considered

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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	C1	Elhami, K., and B. Gauthier-Manuel, "Electrostriction Of The Copolymer Of Vinylidene-Fluoride And Trifluoroethylene," *J. Appl. Phys.* Vol. 77 (8), 3987-3990, April 15, 1995.
	C2	Hirose, S., Biologically Inspired Robots: Snake-like Locomotors and Manipulators, *"Development of the ACM as a Manipulator"*, Oxford University Press, New York, 1993, pp.170-172.
	C3	Kornbluh, R., G. Andeen, and J. Eckerle, "Artificial Muscle: The Next Generation of Robotic Actuators," presented at the Fourth World Conference on Robotics Research, SME Paper M591-331, Pittsburgh, PA, September 17-19, 1991.
	C4	Kornbluh, R., R. Pelrine, J. Joseph, "Elastomeric Dielectric Artificial Muscle Actuators for Small Robots," *Proceedings of the Third IASTED International Conference on Robotics and Manufacturing,* June 14-16, 1995, Cancun, Mexico.
	C5	Kornbluh, R., Pelrine, R., Eckerie, J., Joseph, J., "Electrostrictive Polymer Artificial Muscle Actuators", IEEE International Conference on Robotics and Automation, Leuven, Belgium, 1998
	C6	Kornbluh, R., R. Pelrine, Jose Joseph, Richard Heydt, Qibing Pei, Seiki Chiba, 1999. "High-Field Electrostriction Of Elastomeric Polymer Dielectrics For Actuation", Proceedings of the SPIE International Symposium on Smart Structures and Materials: Electro-Active Polymer Actuators and Devices, March 1-2, 1999, Newport Beach, California, USA. pp. 149-161.
	C7	Kornbluh, R. D and R. E. Pelrine., "Kornbluh, R., R. Pelrine, Q. Pei, S. Oh, and J. Joseph, 2000. "Ultrahigh Strain Response of Field-Actuated Elastomeric Polymers," Proceedings of the 7th SPIE Symposium on Smart Structures and Materials-Electroactive Polymers and Devices (EAPAD) Conference, March 6-8, 2000, Newport Beach, California, USA, pp. 51-64
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Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
	D1	Liu, C., Y. Bar-Cohen, and S. Leary, "Electro-statically stricted polymers (ESSP)," Proceedings of the SPIE International Symposium on Smart Structures and Materials: Electro-Active Polymer Actuators and Devices, March 1-2, 1999, Newport Beach, California, USA., pp. 186-190.
	D2	Ohara, K., M. Hennecke, and J. Fuhrmann, "Electrostriction of polymethylmethacrylates," *Colloid & Polymer Sci.* Vol 280, 164-168 (1982).
	D3	Pei *et al.*, "Improved Electroactive Polymers", U.S. Patent Application No. 09/619,847, filed July 20, 2000, 70 pages
	D4	Pelrine, R., R. Kornbluh, and Q. Pei. "Electroactive Polymer Transducers And Actuators", U.S. Patent Application No. 09/620,025, filed July 20, 2001, 58 pages.
	D5	Pelrine, R. and Kornbluh, "Electroactive Polymer Devices," U.S. Patent Application No. 09/619,846, filed July 20, 2000, 69 pages
	D6	Pelrine, R, R. Kornbluh, J. Joseph, and S. Chiba, "Electrostriction of Polymer Films for Microactuators," *Proc. IEEE Tenth Annual International Workshop on Micro Electro Mechanical Systems,* Nagoya, Japan, January 26-30, 1997, pp. 238-243.
	D7	Pelrine, R., R. Kornbluh, and J. Eckerle. "Energy Efficient Electroactive Polymers and Electroactive Polymer Devices", U.S. Patent Application No. 09/779,373, filed February 7, 2001.

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Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
	E1	Pelrine, R., R. Kornbluh, and J. Joseph, FY 1998 *Final Report on Artificial Muscle for Small Robots*, ITAD-3482-FR-99-36, SRI International, Menlo Park, California, 1999
	E2	Pelrine, R., R. Kornbluh, and J. Joseph, FY 1999 *Final Report on Artificial Muscle for Small Robots*, ITAD-10162-FR-00-27, SRI International, Menlo Park, California, 2000
	E3	Pelrine, R., R. Kornbluh, Q. Pei, and J. Joseph, "High Speed Electrically Actuated Elastomers with Over 100% Strain," *Science,* Vol. 287, No. 5454, pages 1-21, 2000
	E4	Pelrine, R., Roy Kornbluh, Jose Joseph, Qibing Pei, Seiki Chiba "Recent Progress in Artificial Muscle Micro Actuators," , SRI International, Tokyo, 1999 MITI/NEEDOIMNIC, 1999
	E5	Pelrine, R., J. Eckerle, and S. Chiba, "Review of Artificial Muscle Approaches," invited paper, in *Proc. Third International Symposium on Micro Machine and Human Science,* Nagoya, Japan, October 14-16, 1992
	E6	Smela, E., O. Inganäs, and I. Lundström, "Controlled Folding of Micrometer-size Structures," *Science,* Vol. 268, pp. 1735-1738 (23 June 1995).
	E7	Uchino, K. 1986. "Electrostrictive Actuators: Materials and Applications," *Ceramic Bulletin*, 65(4), pp. 647-652, 1986
	E8	Pelrine *et al.*, "Electroactive Polymer Generators", U.S. Patent Application No. 09/619,848, filed July 20, 2000, 69 pages
	E9	Pelrine, R., R. Kornbluh, J. Eckerle "Monolithic Electroactive Polymers" U.S. Patent Application No. 09/779,203 filed February 7, 2001
	E10	Kornbluh, R., R. Pelrine, Q. Pei and J. Eckerle "Electroactive Polymer Sensors", U.S. Patent Application No. 10/007,705, filed December 6, 2001.

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	F1	Pelrine, R. R. Kornbluh, J. Eckerle, S. Stanford, S. Oh and P. Garcia, "Biologically Powered Electroactive Polymer Generators", U.S. Patent Application No. 09/792,877, filed February 23, 2001
	F2	Lakes, R.S., "Extreme damping in compliant composites with a negative stiffness phase", Philosophical Magazine Letters, 81, 95-100 (2001)
	F3	Lakes, R.S., "Extreme Damping in Composite materials with a negative stiffness phase", Physical Review Letters 86, 2897-2900, 26 March (2001).
	F4	Lakes, R.S., Lee, T., Bersie, A., and Wang Y.C., "Extreme damping in composite materials with negative stiffness inclusions", Nature, 410,565-567 March (2001).
	F5	Pei, Qibing, R. Pelrine, R. Kornbluh, S. Jonasdottir, V. Shastri, R. Full, "Multifunctional Electroelastomers: Electroactive Polymers Combining Structural, Actuating, and Sensing Functions, ITAD-433-PA-00-123, available at www.sri.com-publications, January 17, 2001.
	F6	Kornbluh, R., R. Pelrine, Q. Pei and V. Shastri "Electroactive Polymer (EAP) Actuators as Artificial Muscles - Reality, Potential and Challenges", Chapter 16, available from SPIE Press on May 2001.

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